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ORIGINAL ARTICLES

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OTITIS MEDIA IN INFANTS AND CHILDREN*

By CLIFFORD D. SWEET, M. D., Oakland, Cal.

The purposes of this paper are:

1. To emphasize the necessity of the inspection of the membrana tympani as an important part of the physical examination in all infants and children.
2. To point out that, if the relief afforded by early diagnosis is to be given the patient, this examination must be made by the family physician, for the reason that only those cases with sufficiently marked and definite symptoms to enable the parent to make the diagnosis fall directly into the hands of the aurist.
3. To call attention to the fact that the necessary skill required to make this inspection can be acquired with a moderate expense of time and diligence by any intelligent physician.
4. To illustrate by brief summaries of cases which have been under my care, the variety of symptoms which may be present in cases of otitis.
5. To re-emphasize the necessity of early paracentesis of the tympanum, in order to prevent serious and prolonged inflammatory processes with their attending dangers.

If scientific medicine is to progress as it should, our every effort must be made to raise the general level of diagnostic ability and accomplishment among all of us who stand in the public eye as its disciples. As the very foundation of all diagnostic procedures, a complete physical examination will always be essential. No refinement of laboratory methods and no limitation of practice to a specialty can remove the necessity of first securing this fundamental information, which comes to us only by the use of our own senses. Only after we possess and have recorded these findings can laboratory findings or the report of a specialist be properly evaluated. Furthermore, if the best interests of the patient are to be served and unnecessary loss of his time, money, and not the least—his confidence in scientific medicine—are to be avoided, the complete physical examination is the only basis upon which laboratory tests can be ordered or consultation requested. Lastly, it must form the basis of all surgical interference except it be of the most obvious and minor nature.

The above considerations apply with especial point to otitis media in infants and children. The infant or the child may have an otitis of any grade without localizing symptoms or with typical symptoms coming so late that serious damage has resulted before treatment is begun.

Since diagnosis can depend only in part on symptoms, the physician must school himself to see the tympanic membrane. As in the entire field of medicine, he who would recognize the abnormal must first have a clear mind picture of the normal. With reasonable diligence, a proper light, and instruction which can be had during a few hours in any ear clinic, this picture can be firmly and clearly fixed in the mind. Within a short time, departure from this normal will be recognized with sufficient clearness. If in doubt, an aurist can be called and, after a few such consultations during which the tympanum is inspected under expert guidance, the ability to recognize these departures from the normal is greatly increased.

Otitis media, because of its high rate of incidence and because of its serious import to the patient, should be looked for routinely. Some inflammation, catarrhal or purulent, of the tympanic cavity occurs in the course of many acute upper respiratory infections—probably in 25 to 40 per cent of all that run a febrile course of twenty-four hours or longer in infants. The incidence of this condition as a complication, during the contagious diseases of childhood and in such systemic infections as pneumonia, is too well known to need

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more than passing notice here. The results in improperly managed cases and in those cases harboring a virulent organism are extremely unfortunate, resulting in loss of life with secondary meningitis, cerebral abscess, or septicaemia, and with loss of, or at least with placing in jeopardy, a greater or lesser percentage of the acoustic function because of mastoiditis with its attendant chronic otitis.

That otitis media cannot be diagnosed except by a careful inspection of the tympanic membrane is evident to anyone who follows a few cases in infants and children. Pain is by no means a constant symptom and, when present, may be referred to the frontal region, the opposite ear, or to the posterior cervical region. Small infants may keep up a more or less constant rolling of the head, probably because of the presence of pain or headache. The belief, however, that pain accompanies all inflammatory processes of the middle ear is widespread not only among laymen, but also among members of the medical profession. Very frequently after making a diagnosis of otitis media, I have had both the mother and the family physician say, with evident doubt in voice and expression, "But doctor, there has been no sign of pain." Likewise, tenderness about the ear or on movement of the auricle may be entirely absent. This, too, especially among physicians, is thought to be a constant sign, and its absence is taken as proof that no otitis exists. In young infants an otitis that produces inflammation of considerable degree may often be detected because manipulation of the auricle is painful. Often the mother's attention is attracted to the ear in this manner. This complaint on the part of young infants is produced because the absence of a bony external auditory meatus permits movement of the area of infiltration about the membrana tympani. This symptom disappears in older children because the cartilage of the meatus becomes separated by a well-defined bony meatus, and the tympanic membrane no longer shares in its movement.

Since these two classical symptoms may or may not be present, it is evident that careful inspection of the tympanum must be made in all cases. That otitis of severe grade may exist without other symptoms than fever is illustrated by the following:

G. F., an unusually intelligent girl of 11 years, was seen in consultation because of a fever of three days' duration for which no satisfactory explanation could be found. About one hour before she was seen the left typanic membrane had ruptured, and at examination the meatus was filled with purulent material. This progressed to a mastoiditis that required surgical relief. At no time was there complaint of pain or mention of discomfort or tenderness about the ear prior to the rupture.

E. T., age 6 years, was seen in the fourth week of an illness characterized by continuous fever ranging from 101 to 104⁵. While the child was toxic, there was no complaint, and only late in the disease was there a spontaneous rupture of both tympanic membranes with the discharge of a small amount of purulent material. Even after rupture the amount of discharge was so small that it attracted but little attention and repeated Widal tests were made in an attempt to establish the diagnosis of typhoid fever. During this time she was seen in consultation by a colleague whose training, judgment, and ability are of a very high order, but as no tenderness on pressure, or pain on movement of the auricle could be elicited, otitis was dismissed as a probable cause of the fever. When seen by the writer no cause for the fever was apparent, except the ear condition. In both auditory canals a small amount of pus was present. On inspection there was such complete prolapse of the superior and posterior walls of the auditory canals that no part of the tympanic membranes were visible. A diagnosis of bilatural mastoiditis was made, and the following morning Dr. F. M. Shook did a double operation revealing a very marked involvement of both mastoid areas with extensive bony necrosis. In this case there must have been considerable mastoid tenderness, but as the child was an unusually diffident one, it was difficult to elicit definite signs.

Even when pain and tenderness are present, they do not indicate accurately the degree of the pathological process. Many times the most painful otitis will subside within a few hours, requiring only expectant treatment. Whether or not the expectant method may be safely followed can be determined only by careful and repeated inspection of the tympanum. Then, too, pain when present, may be irregular in character—for example, it may come on only at night. The child may appear to be normal during several days, and suffer each succeeding night with severe ear-pain.

E. S., a girl of 5, suffered severely for five nights with severe pain in the right ear and, because she appeared normal in the day-time, a physician was not called. When seen on the fifth day, the temperature was 100° R, and physical examination was negative except that the right tympanum was a deep red in color, and sufficient bulging had taken place to obliterate all landmarks. Paracentesis released a large amount of serosanguineous fluid. That night the child slept comfortably, and for a few days seemed to be progressing well, when the temperature suddenly shot up, the discharge from the ear became more profuse and decidedly more purulent in character. The ear condition progressed rapidly into a mastoiditis that demanded operation. Very probably had a paracentesis been done early, the result would have been a very simple otitis which would have cleared within a few days.

Fever, while usually present, is not a constant symptom. Where present, with the other direct symptoms as pain, tenderness on pressure or manipulation of the auricle, pointing to or constant handling of the affected ear, complaint by voice or head rolling, the diagnosis is apparent. However, the writer has many times seen infants with a normal temperature whose only symptom was vomiting or restlessness at night, but whose tympanic membranes were one or both bulging markedly and greatly discolored. Upon paracentesis, a free discharge of pus was released from the middle ear, with relief of all symptoms. Often this purulent discharge is maintained for days or even weeks, establishing beyond any possible doubt the true nature of the complaint.

No attack of diarrhoea in an infant or child, whether febrile or afebrile, can be considered completely without giving otitis its proper place either as the causative factor or as a complicating factor which delays or prevents recovery.

A. T., age 16 months, when first seen had been suffering with diarrhoea for two weeks, apparently convalescent for a day or two and then relapsing. All of the usual remedies, castor oil, starvation, colon flushes, carbohydrates, and protein milk, had been tried without avail. Malaria had been considered and ruled out by negative blood findings. Finally, the mother had been told to take him out

of the hot climate of an interior valley. Change of climate had likewise been of little or no aid. On examination and paracentesis a purulent otitis media was demonstrated, the relief of which caused the diarrhoea to disappear at once.

Vomiting is likewise a fairly common presenting symptom of febrile or afebrile otitis, especially in young or marantic infants. Many text-books state that otitis is rare during the first few weeks of life, but we have repeatedly seen it in infants under one month of age. Even in these very young infants its incidence is great enough to make inspection of the ears an important part of the physical examination. In examining young infants, it is well to remember that the tympanic membrane lies almost vertically across the canal, and that it can be seen by slight downward and forward traction on the tragus rather than by backward traction, which is practiced on the older child. I have had one case of mastoiditis with subperiosteal abscess in an infant of five months, whose otitis media began on the tenth day after birth, with a purulent discharge which was continuous until operation.

J C., a boy baby 13 days old, was first seen because of projectile vomiting which indicated pylorospasm and which was sufficiently marked to make us seriously consider pyloric stenosis. On examination both tympani were cherry red and markedly bulging. Paracentesis released a free purulent discharge from both tympanic cavities with subsidence and, after a few days complete clearing up of the symptoms of pylorospasm.

Intestinal indigestion or colic also has as its cause an afebrile catarrhal or purulent otitis. This condition should especially be given consideration if the symptoms are present only or in most marked form at night, and a history of an acute coryza within the preceding ten days makes one consider it as the most probable cause. Frequently we see infants who have been subjected to most unreasonable food changes and deprivations—even weaning from an adequate breast milk supply—when examination and treatment of an otitis was the only indicated treatment. In this connection it is well to remember, as G. F. Still points out, that a catarrhal otitis may exist in a sufficiently active form to produce systemic symptoms for a long period of time—even weeks or months.

J. R., age 7 months, was seen because of persistent "night colic," which had caused restlessness, crying, and much flatulence for a period of five or six nights. Several food changes including both increasing and decreasing the food had been without avail. About seven days before the beginning of symptoms, there had been an acute coryza. Examination revealed a reddened left tympanic membrane, but no bulging—the temperature being normal. Instillation of 10 per cent carbolic acid in glycerine every two hours during the waking hours, and the insertion of a cotton plug in the external auditory meatus at bedtime gave instant and complete relief.

SUMMARY AND CONCLUSIONS

1. Every effort should be made to improve the level of diagnostic ability of the members of our profession. This can be forwarded by the members making careful routine physical examinations.

2. Otitis media in infants and children is so frequently present without localizing symptoms that inspection of the tympanum is a necessary routine part of every physical examination. This inspection presents no technical difficulty that cannot be overcome by the general practitioner.

Much more could be written on this interesting and important subject. It is hoped this may stimulate the general practitioner and the specialists who handle children to give it close and careful study.

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DISCUSSION

Langley Porter, 240 Stockton street, San Francisco—The importance of the subject which Sweet presents is hardly to be overestimated. Anyone who deals much with sick children soon comes to feel that neglect to examine the ears is a negligence for which the infant pays dearly. Sometimes the payment is made in unnecessary pain or unduly prolonged fever, which disappears after spontaneous rupture of the tympanum. At other times the toll is taken in terms of insidious diseases, mastoiditis, zygomatitis, subdural abscess, sinus thrombosis, meningitis, brain abscess, or general sepsis.

In the modern type of electric otoscope which carries its power in dry cells concealed in the handle, we have an instrument that is convenient and capable of perfectly illuminating the ear-drum, and presenting the observer with a magnified image of that structure. If the physician will make observation of the ear-drums part of his routine examination, he will soon be so familiar with these structures that slight variations from health will arrest his attention at once. Such procedure on the part of all those who deal with babies would soon remove otitis media from the group of pathological entities commonly overlooked in infant patients, a group which includes otitis and its complications—cystitis, scurvy, intussusception, and empyema.

Sweet has properly laid stress on the fact that in many instances otitis comes on and consummates without pain or tenderness that can be referred to the ear, indeed, sometimes with no pain at all, so that when we are confronted by a feverish infant or child, one of our first duties is to exclude a possible otitis even when the patient suffers no pain.

One point that the speaker has not stressed is that very extensive otitis may occur without reddening of the drum or of the auditory canal.

During the epidemics of influenza some years ago, the otologists of the Children's Hospital made routine otoscopic examination of the ears—morning and night—and on many occasions after finding the drum apparently normal at one examination were confronted with a rupture and a discharging otitis at the next. In all the cases which behaved in this way, pneumococci were grown from the discharge in pure culture. Such cases are less important than those of the smaller group in which otitis occurs without pain and without rupture going on to dangerous complications.

Every children's hospital can show records of such cases. For instance: An infant suffering from underweight, with diarrhoea, after the diarrhoea was cured continued to have a high leucocytosis and a septic temperature, which on several occasions reached 106° to 108°. This state of affairs lasted for some six weeks, and during this time the child's ears were repeatedly examined by various members of the medical staff, as well as by otologists, and not the slightest evidence of inflammation of the drums or of the canal, nor any edema, pain or tenderness could be found; yet, on autopsy, this child had extensive involvement of both middle ears, both mastoids, as well as a subdural abscess on one side.

The record rooms of almost any hospital can furnish duplicates of this case, and it would be possible to quote one and many others from personal experience that could as well, or better, illustrate the point that extensive damage and life-endangering complications can develop in the middle ear and mastoid without any or only the slightest degree of pain, tenderness, swelling, or reddening of the audi-

tory canal or of the tympanum. Such possibilities not only emphasize the need for observation of the points Sweet has brought out, but they make it incumbent on all of us to give weight to the ear as a source of insidious disease and to such study of the not infrequent mystifying attacks of fever with leucocytosis which can develop from this organ. Following such a course, we will be able by exclusion to arrive at diagnosis of the ear-drums in the absence of positive aural findings.

Clifford D. Sweet (closing)—I want to thank Dr. Porter for calling our attention to the cases that develop an otitis media of severe grade without physical signs that can be discovered by otoscopic examination. I have seen such cases, but after consideration did not include them in this paper for fear of making the diagnosis appear to be more difficult than it is. At another time I hope to present an additional discussion of otitis media.

LOCAL ANESTHESIA IN MAJOR SURGERY: ITS USES AND LIMITATIONS *

By L. ELOESSER, M. D., San Francisco

From the Division of Surgery, Medical Department Stanford University.

The request of your secretary, Dr. Rethwilm, to discuss local or regional anesthesia in major surgery has given me a welcome opportunity. The time is ripe, I think, to discuss not so much the various applications of local anesthesia as to attempt a delineation of its indications and limitations. Local anesthesia no longer needs a plea. It has come to stay. Twelve years ago a paper of mine, sketching some of the uses to which it might be put, was printed in the California State Journal of Medicine. Such a paper would be superfluous today. There is scarcely a hospital in which local anesthesia is not in daily practice. We need nowadays rather to scan the possibilities and impracticabilities of this lusty and sometimes outrageous youth; to curtail his vagaries and bizarre excursions, and to properly confine his activities. As is usual with these striplings, charmed with the exhibitions of their first prowess, he has run too far.

One has but to read reports of strange methods of splanchnic injection, of paravertebral injection, of arterial injection, to realize that the technical fascination of this kind of narcosis has led adepts in the art to the elaboration of complicated tricks and show-pieces that lose all sight of the end they wish to attain; viz., the most innocent and easiest abolition of surgical pain. These tricks and show-pieces have not been without a certain usefulness. At certain rare times they may be of practical value; aside from this, they show what can be done.

The object of any narcosis, whether regional or general, is to prevent pain. The easiest and most innocent way—easiest and most innocent, not for the surgeon, but for the patient—should be the way of choice. This formula for indications and contraindications for methods of narcosis is so simple that it seems a platitude, and to dwell on it, as Henry James says, "the laborious demonstration of the self-evident." But it is not simple. There are too many factors that govern what is easy and innocent, and too many varying ones—factors varying with particular patients, particular surgeons, particular times and places of operating, with assistance and equipment and circumstances.

These factors, both the varying and the fixed ones, I shall try to discuss.

First, the fixed ones. There are certain disorders and diseases in which even the temporary loss of all safeguarding reflexes is harmful; natural reflexes—pain and muscle spasm to splint injured parts; cough. There are certain disorders where loss of consciousness is harmful in that it allows the patient to do things he should not do—to struggle and toss about, to strain, to cough, to make deep or uncontrolled respirations, to vomit. There are certain operations—on nerves and tendons—which may be made more difficult by the inability of a patient to co-operate.

When, therefore, loss of consciousness is in itself harmful, because it abolishes the reflexes, or deprives the patient of self-control or the ability to co-operate, regional anesthesia is the method of choice and is preferable to general narcosis. To illustrate: The loss of safeguarding reflexes is harmful in many disorders of the mouth or of the lung. It is true that modern devices for insufflation anesthesia have lessened the dangers of aspiration from the mouth, but none of these is as effective as a cough in clearing the lung of material that may enter it.

As harmful as the things that a patient does *not* do when his reflexes are gone are the things he does when he loses consciousness. No one, for instance, would prescribe for a tubercular patient deep-breathing exercises and violent muscular exertion. Yet that is what he often does when he goes under an anesthetic—breathes deeply, struggles, and tosses about. It is not nitrous oxid gas, in this instance, that damages the pulmonary parenchyma; it is the deep respiration and the muscular exertion that bring on a post-anesthetic exacerbation of tuberculosis.

A man suffering from a fractured skull, with intracranial hemorrhage, we treat in a way calculated to reduce the intracranial pressure. We keep him quiet, we give him epsom salts. But we put him to sleep with ether (1 c.). Unconscious, he is trundled about from a gurney to the operating-table; he struggles, he vomits—during, perhaps, or after his anesthetic—he does everything he should not do to keep the pressure in his intracranial vessels down. It is not the ether that hurts this man; it is the effect of uncontrolled and uncontrollable incidents of the loss of consciousness.

In operations, therefore, where loss of consciousness is in itself harmful, local anesthesia is the method of choice. Into this category will fall, mainly, certain operations on the brain and operations involving the respiratory tract. But not abdominal operations. A temporary loss of consciousness is not harmful to patients undergoing a laparotomy. We have not our viscera under voluntary control. They work the same whether we are asleep or awake. Consciousness is not a help; it is a hinderance, when the belly is opened.

These, then, are fixed factors in governing our choice of anesthetic. In such and such a disorder

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